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SOME CANADIAN CERUSSITE CRYSTALS

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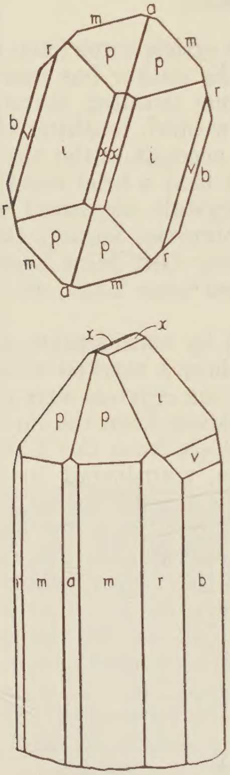
ALL of the crystals described in this article come from localities in British Columbia, and, so far as the author has been able to ascertain, there has been no previous detailed description of cerussite crystals from any of these western localities or indeed from any part of Canada. On this account, altho the crystals include no new forms, it was thought that a brief description of them would be of interest. The crystals measured are from three distinct localities in British Columbia, namely the North Star Mine near Kimberley, the Society Girl Mine near Moyie, and the Ymir and Yankee Girl Mines near Ymir, all of which are in the Kootenay District.

Altho these localities are separated by considerable distances, the cerussite crystals from all three show a marked similarity in form and appearance. In all, twenty-six crystals were measured —eight from the North Star Mine, eleven from the Society Girl Mine, one from the Ymir Mine, and six from the Yankee Girl Mine. All of the crystals are white, translucent to colorless, transparent, and most of them have a good luster. A great many twin crystals were encountered, but, with few exceptions, the crystals measured were single individuals. No particular attention was paid by the writer to the twin crystals; but in the half dozen twins observed, the twinning plane seemed to be invariably the unit prism. The crystals were for the most part rather poor in faces, although one showed thirty-two. A considerable number of them were developed on one side only, so that only a limited number were used for purposes of calculation. The crystals are of two types, one prismatic in habit and the other flattened in the direction of the macro-axis. The basal pinacoid is rare and is found on only one crystal out of the twenty-six. The minerals associated with cerussite in these localities include galena, sphalerite, chalcopyrite, malachite, pyromorphite, garnet, quartz, and calcite.

NORTH STAR MINE, KIMBERLEY

The crystals from this locality are comparatively simple, showing the following forms: $c = 0(001)$, $a = \infty 0(100)$, $b = 0 \infty (010)$, $m = \infty (110)$, $r = \infty 3(130)$, $x = 0\frac{1}{2}(012)$, $k = 01(011)$, $i = 02(021)$, $v = 03(031)$, $y = \frac{1}{2}0(102)$, $p = 1(111)$. Of the eight crystals measured only four were used for the determination of the elements, the remainder lacking the symmetry necessary for an accurate determination. The average values obtained from these four crystals are as follows: $p_o = 1.1849$, $q_o = 0.7242$, which are in close agreement with the values in Professor Goldschmidt's Winkel-Tabellen, namely $p_o = 1.1853$, $q_o = 0.7230$. Fig. 1 represents an idealized composite drawing in plan and perspective of the crystals from this locality. The dimensions of these crystals vary from $2 \times 1\frac{1}{2} \times \frac{1}{2}$ mm. to $5 \times 4 \times 2$ mm. The forms *a*, *b*, *m*, *i*, and *p* are prominent, being found on all of the eight crystals, the forms *r*, *v*, and *x* somewhat less so, while the remaining forms *c*, *y*, and *k* each occur on one crystal only, and are consequently not shown in Fig. 1.



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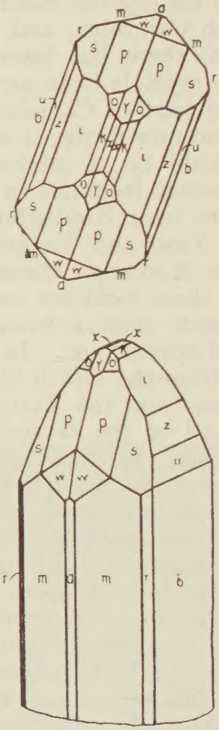

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FIG. 1. Represents an idealized composite drawing in plan and perspective of the cerussite crystals from the North Star Mine, Kimberley, B. C.

FIG. 2. Represents a more or less idealized cerussite crystal type from the Society Girl Mine, Moyie, B. C.

SOCIETY GIRL MINE, MOYIE

The crystals from this locality are characterized by an abundance of dome faces, chiefly brachydomes. The following forms were encountered: $a = \infty 0(100)$, $b = 0\infty(010)$, $m = \infty(110)$, $r = \infty 3(130)$, $x = 0\frac{1}{2}(012)$, $k = 01(011)$, $i = 02(021)$, $v = 03(031)$, $z = 04(041)$, $n = 05(051)$, $t = 06(061)$, $u = 07(071)$, $y = \frac{1}{2}0(102)$, $p = 1(111)$, $0 = \frac{1}{2}(112)$, $s = 12(121)$, $w = 21(211)$. Altho eleven crystals were measured, only six were found to be sufficiently symmetrical to give accurate determinations of the elements. These averaged: $p_o = 1.1858$, $q_o = 0.7230$, which are in close agreement with the values as given by Goldschmidt. Fig. 2 represents a more or less idealized crystal type for this locality. The crystal is drawn both in plan and perspective and shows all of the forms encountered on the various crystals from this locality, with the exception of the forms *v*, *n*, and *t*, which were found to be too close to the forms *z* and *u* to be shown to advantage. The crystals measured vary in dimensions from 2 x 1 x ½ mm. to 10 x 7 x 2 mm. The forms *a*, *b*, *m*, *r*, *x*, *k*, *l*, and *p* are prominent, *y*, *o*, *z*, and *n* somewhat less so, while *t*, *u*, *s*, and *w* are comparatively rare.

YMIR AND YANKEE GIRL MINES, YMIR

The Ymir crystals are intermediate in type, showing some forms characteristic of crystals from the North Star Mine and some of those from the Society Girl Mine, as well as forms that are common to all three localities. The dome faces are not so prominent as in the Moyie crystals, but are more abundant than in the crystals from the North Star Mine, while the only pyramid is the form $p = 1(111)$. Of the seven crystals measured only three were suitable for calculation of the elements. The average values for the latter from these three crystals are: $p_o = 1.1852$, $q_o = 0.7233$, which are also in close agreement with Goldschmidt's values. The crystals vary in size from 1 x ½ x ¼ mm. to 5 x 4 x 1½ mm. The forms *b*, *m*, *i*, and *p* are prominent, *a*, *r*, *x*, *k*, and *v* somewhat less so, while *z*, *n*, and *y* are comparatively rare.

TABLE 1. HABITS OF CERUSSITE CRYSTALS

Locality.	Cryst No.	m	r	l	p	b	a	x	y	k	o	v	z	n	t	u	w	s	c
North Star Mine	7	*	*	*	*	*	*		*										
	8	*	*	*	*	*	*	*	*										
	1	*	*	*	*	*	*			*		*							
	2	*	*	*	*	*	*		*										*
Society Girl Mine....	9	*	*	*	*	*	*			*									
	14	*	*	*	*	*	*	*	*	*	*								
	16	*	*	*	*	*	*	*		*		*							
	10	*	*	*	*	*	*	*	*	*	*	*	*						
	18	*	*	*	*	*	*	*	*	*	*	*		*	*				
	12	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			
	19	*	*	*	*	*	*	*	*		*		*	*	*	*	*		
	13	*	*	*	*	*	*	*	*	*	*						*	*	
Ymir and Yankee Girl Mines......	20	*	*	*	*	*	*												
	21	*	*	*	*	*		*											
	22	*	*	*	*	*	*	*	*	*			*						

FAMOUS MINERAL LOCALITIES. 5. THE BLACK HILLS OF SOUTH DAKOTA

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Washington, D. C.

It is not the purpose of this article to attempt to give anything approaching a complete account of the minerals of this very prolific region; there is already available a 250-page publication in which they are fully described.[1] But it seems well worth while to outline what the mineralogist who can spend but a few days in the Black Hills may reasonably hope to find, according to the writer's experience, covering about a week early in May, 1917, collecting for the National Museum. The best time of year to make such a trip is probably the month of June, after all chance of heavy snow is over—several inches fell during the writer's visit—and before the hot dry weather of late summer sets in.

Four railroad lines lead from Chicago into the Black Hills region, named for short the Burlington, Milwaukee, and Northwestern (two routes). At the advice of Dr. Freeman Ward, the state geologist, the writer took the one which from the time-table seemed the least desirable, the Chamberlain-Rapid City route of the Chicago, Milwaukee and St. Paul Railway. Leaving Sioux City, Iowa, which is 100 miles north of Omaha, and 500 miles west of Chicago, in the early evening, the monotonous plains country is traversed at night and in the morning the traveller finds himself at Murdo-Mackenzie. Here he must leave the luxurious Pullman, and board a combined passenger, smoker, baggage, observation, and nursery car attached to the rear of a freight train, which is scheduled to stop ten or fifteen minutes at each station to discharge freight, but which, if there is no freight, stops anyway. The route traverses the famous Big Bad Lands, and the leisurely trip furnishes a splendid opportunity to gain an idea of the remarkable erosion forms shown by the soft strata, which anyone interested in geology will greatly appreciate. Rapid City is reached early in the afternoon—an hour being gained by the fact that mountain time is used there. The South Dakota School of Mines is located about a mile south of the center of town, and is well worth a visit if one has a few hours to spare. Their collections of Black Hills minerals and ores are very complete.

There are stage lines running from Rapid City thru the heart of the Black Hills region, and the famous mineral district around Keystone can easily be reached in half a day by one of them, information as to the schedules of which can be obtained at the post-office. Keystone is a tiny mining town, occupying a narrow valley, or rather a group of valleys, in the midst of magnificent mountain scenery. Fairly good lodging can be obtained there, and at least two days should be devoted to the visit.

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[1] "The minerals of the Black Hills," Victor Ziegler, *S. Dak. Sch. Mines, Bull.* 10, Dept. Min. Geol., Rapid City, 1914.

The principal features of mineralogic interest around Keystone are the rare-metal-bearing pegmatites, which are worked primarily as a source of lithium compounds. The veins outcrop at the summits of sharp hills near the town; the collector, if newly arrived from the east, will find climbing these makes him puff considerably, and may wonder what can be the matter, until he chances to look at the topographic map—the Hermosa quadrangle covers this region—and discovers that the hilltops are nearly a mile above sea level, and the air correspondingly is much more highly rarefied than that to which he is accustomed.

The most famous locality is the Etta mine or quarry—originally opened as a tin mine—a mile south of the town, where the most remarkably developed mineral is spodumene, lithium aluminium metasilicate. This occurs in huge columnar crystals known to the workmen as logs extending thru the rock in all directions; some of these are recorded as attaining a length of over 40 feet, and at the time of the writer's visit one wall of the quarry showed the impression of one nearly as long as this, the spodumene itself having been broken away. There are hundreds of crystals of over a foot in diameter, and indeed this mineral largely takes the place of the feldspar which is usually the most prominent constituent of pegmatites. Scattered thru the rock are also good-sized masses of white beryl, and bunches of triphylite which weathers to a characteristic bronzy color, owing to the oxidation of the manganese. Now and then a zone is encountered where blades of columbite traverse the rock, and excellent specimens of this rare mineral can readily be obtained. Cassiterite occurs mostly as tiny grains scattered thru a somewhat crumbly greenish muscovite mica. Rarer minerals are strueverite, which resembles both cassiterite and columbite, and can be certainly distinguished from them only by chemical tests, and stannite, which is altered to bright green or brown colloidal tin hydroxide minerals, known broadly as "cuprocassiterite." Then there is a peculiar dull dark-blue mineral, imbedded in quartz or feldspar, which seems to be mostly apatite, altho some iolite of similar aspect is said to have been found. Uranium minerals are extremely rare in this pegmatite, but the superintendent of the quarry kindly presented the writer with a fragment showing a trace of autunite.

A short distance west of the Etta mine is the Hugo, a similar tho less extensive quarry, near the summit of another hill. This was not in operation at the time of the writer's visit, and only a few specimens of an unusually bright blue apatite were obtained from its dumps. But the Peerless mine, just southwest of the town, proved to be another interesting place. Here spodumene is practically absent, but in its place occurs the rare mineral amblygonite, lithium aluminium fluo-phosphate, in enormous masses, sometimes weighing hundreds of pounds. About the same accessory minerals occur as at the other localities.

There are a number of other mines and quarries in the general neighborhood of Keystone, but they had practically all been unworked for years at the time of the writer's visit. At the Columbia gold mine, at one end of the town, translucent quartz containing a little visible gold and lamellar calcite[1] were noted; but the writer's time was so limited that no other localities in this neighborhood could be visited.

Instead of returning by the same route as was followed coming to Keystone, the collector will find it worth while to leave by the stage going in the opposite direction, to Hill City, about 10 miles west of Keystone. A splendid view of Harney Peak, the highest in the Hills, is obtained on the way. In the vicinity of Hill City there are several mines worked especially for tungsten, the ore consisting of wolframite blades traversing white quartz. Some cassiterite occurs here also, usually in distinctly larger masses than are found at the Etta mine, and in fact in sufficient amount to pay for working, on a limited scale, with the metal tin bringing war prices. The Deadwood line of the Burlington railroad passes thru Hill City, so that other points of interest can be readily reached, or the return trip started, from that place. At Lead (pronounced leed) about 50 miles to the north, is the famous Homestake gold mine. The writer did not visit this because the snow was so deep in the region at the time that transportation, hiking, and collecting were unusually difficult. Near the town of Custer, 15 miles south of Hill City, there are several mineral localities, especially rose quartz workings, but these were reported to be idle in 1917. About the only other mineral which the writer saw on his trip was gypsum, which occurs in clays on the plains south of the Hills, formed by the action of sulfuric acid, derived from the decomposition of pyrite, upon calcite in the clay. From Edgemont, the southern terminus of the Deadwood line, Denver may be reached by an overnight trip, or Omaha in a night and a day.

The officials in charge of the several mines visited were most courteous, extending free permission to collect all specimens desired. At Keystone the writer had the good fortune to meet Mr. Emil E. Hesnard, who lives down the hill from the Etta mine, and who is well posted on the minerals of the region. Any mineralogist visiting that vicinity should certainly not fail to look him up, and see his collection of the local minerals.

Mr. Herbert P. Whitlock, since 1904 Mineralogist in the New York State Museum, at Albany, has been appointed Curator of Mineralogy in the American Museum of Natural History, New York City, as successor to the late Louis P. Gratacap.

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[1] *Am. Min.*, **2**, 139, 1917.

NOTES AND NEWS

There are several minerals, valuable in industry because of peculiar physical properties, the supply of which has been cut off by the war. Transparent fluorite, used in lenses, was formerly all obtained from Germany, but it is reported that deposits have now been found in Illinois of sufficient size and quality to supply our needs. Calcite of Iceland-spar quality has, however, disappeared from the market. Can not some American mineralogist discover a workable deposit? Perhaps our readers can suggest other instances.

PRISMATIC CLEAVAGE IN BERYL. Alfred C. Lane, *Tufts College*. —The mineralogies do not generally refer to a prismatic cleavage for beryl, altho Hintze states that "vertical parting is occasionally produced, probably more by a shell-like structure than by real cleavage." A large piece of beryl from Grafton, New Hampshire, in our collection was recently discovered to exhibit such distinct cleavage as to lead to misidentifications by some of our best students. This led to the examination of other specimens, in the Tufts, Harvard, and Tech. collections, and Professors Palache, Warren, and the writer all agree in finding a distinct cleavage parallel to the prism, $(10\bar{1}0)$. The cleavage is about as good as that of nephelite. It is suggested that others look the matter up, and if this proves to be a general relation that writers of mineralogies modify their descriptions of beryl accordingly.

SOME MINERALS FROM SYLMAR, PENNSYLVANIA. Edgar T. Wherry, *Washington, D. C.*—In the "spar" quarries two miles northwest of Sylmar, West Nottingham Township, Chester County, Pennsylvania, minerals other than massive feldspar and quartz are very rarely found. Joint planes are sometimes dotted with curious rosettes of secondary albite which suggest insects crawling over the rock, but the usual pegmatite minerals are conspicuously absent. About five years ago the writer visited that region, and noticed a tiny patch of pink, greenish, and yellowish materials in a fragment of white massive albite. Subsequent examination by the immersion method under the microscope has shown these to possess the optical properties of zoisite, apatite, and serpentine respectively. The first two of these are not uncommon in pegmatites, and the third evidently represents a bit of the country rock which has been picked up by the magma. The association is however so peculiar as to make the occurrence seem worth a brief note, even tho the whole specimen is but a centimeter in diameter.

PROCEEDINGS OF SOCIETIES

THE PHILADELPHIA MINERALOGICAL SOCIETY

Wagner Free Institute of Science, March 14, 1918

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the President, Dr. Leffmann, in the chair. Fifteen members and three visitors were present.

Mr. Louis H. Koch presented a paper on Abbe Haüy's position in crystallography, illustrated by Dr. H. Burgin with a series of models.

Mr. Harold Evans was elected an active member. Mr. Charles W. Hoadley was proposed by Mr. Gordon for active membership.

Samuel G. Gordon, *Secretary*

We regret to announce the death on March 19, 1918, of one of our most valued and active members, Mr. George W. Geist, of Frankford, Philadelphia, Pa.

ABSTRACTS OF MINERALOGIC LITERATURE

THE LIMITS OF MIXED CRYSTALS IN MUSCOVITE AND BIOTITE. H. E. Boeke. *Neues Jahrb. Min. Geol.*, **1916**, I, 83–117; thru *J. Chem. Soc.*, **110**, II, 570, 1916.

The results of 207 analyses of these minerals are plotted on a tetrahedral diagram, and indicate the mean compositions to be on a line between $R_2O.R_2O_3.2SiO_2$ and $2RO.SiO_2$ respectively. (R standing for various replaceable metals.) E. T. W.

THE GENERAL APPLICATION OF THE REGULAR TETRAHEDRON TO THE REPRESENTATION OF FOUR-COMPONENT SYSTEMS; ITS APPLICATION TO ALKALINE AND ALUMINOUS AMPHIBOLES. H. E. Boeke. *Neues Jahrb. Min. Geol.*, **1916**, I, 118–125; thru *J. Chem. Soc.*, **110**, II, 570, 1916.

A general formula is given for projecting analyses to any desired plane in a tetrahedral diagram, and is illustrated by application to the amphiboles.

E. T. W.

MINERALS FROM LOWER TUNGUZAKA IN A. CHEKANOVSKII'S COLLECTION. E. E. Kostuileva. *Bull. acad. sci. Petrograd*, **1916**, 1069–82; Abstract by H. M. Gordin, reprinted by permission from *Chem. Abstr.*, **11**, (10), 1387, 1917.

Detailed description of several minerals, chiefly zeolites.

NEW OBSERVATIONS ON THE STRUCTURE OF THE METEORITES OF CANON DIABLO; INFERENCES WITH REGARD TO THE CIRCUMSTANCES OF THE FALL OF THESE IRONS. S. Meunier. *Compt. rend.*, **162**, 171–173, 1916; abstract by L. W. Riggs, reprinted by permission from *Chem. Abstr.*, **11**, (10), 1387, 1917.

From a reëxamination of the Widmannstätten figures and other physical characters, suggestions are made concerning the geologic history of these meteorites.

MICROSCOPIC INVESTIGATION OF SMALTITE AND CLOANTHITE. A. Beutell. *Centr. Min. Geol.*, **1916**, 180–185; thru *Chem. Abstr.*, **11**, (15), 2179, 1917.

Surfaces of these minerals were attacked by various reagents, and their lack of homogeneity demonstrated. Several different arsenides of cobalt and nickel are present. The so-called skutterudite is apparently a pseudomorph.

E. T. W.

TWO CASES OF TRUE GROWING-TOGETHER OF DIFFERENT KINDS OF MINERALS; I. QUARTZ AND FLUORITE. II. QUARTZ AND MUSCOVITE. G. Kalb. *Centr. Min. Geol.*, **1916**, 201–206; thru *Chem. Abstr.*, **11**, (15), 2179, 1917.

Definite crystallographic relationships are exhibited by the faces of these minerals which grow in contact with one another. E. T. W.

MINERALS FROM THE MANGANESE ORE-DEPOSITS OF OBERHALBSTEIN, GRISONS, SWITZERLAND. F. P. Müller. *Centr. Min Geol.*, **1916**, 457–459; thru *J. Chem. Soc.*, **112**, II, 149, 1917.

The deposits occur in schists, associated with serpentine. Zoisite, epidote, piedmontite, rhodochrosite, rhodonite, and a possibly new hydrous manganese silicate are present. The last is red-brown, sub-metallic, H. = $3\frac{1}{2}$, D. = 2.6, $n = 1.54$, optically —, uniaxial; an analysis is given. E. T. W.

NOTICE.—The plate enclosed in this number was planned for the frontispiece of the April number, but was omitted thru error. It should be pasted into the latter, along the inner edge of page ii, so as to face page 31.

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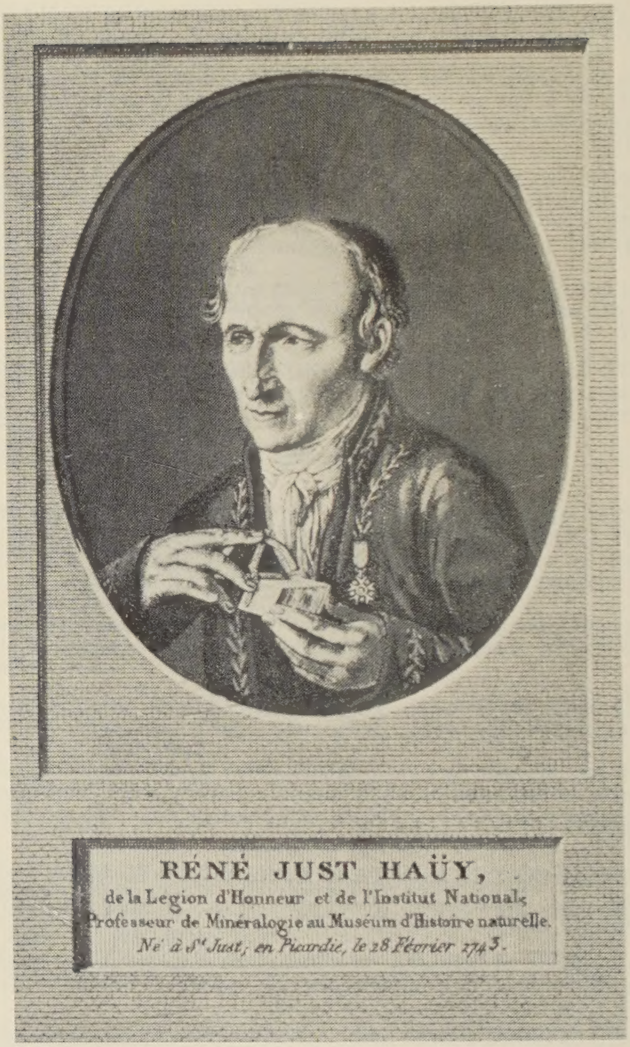
PLATE 2.


RÉNÉ JUST HAÜY,
de la Legion d'Honneur et de l'Institut National;
Professeur de Minéralogie au Muséum d'Histoire naturelle.
Né à St Just, en Picardie, le 28 Février 1743.

Traduit du deſſin de F. Maſſard; *par R. D'Elvaux del.*

"Au savant Auteur des Traités de Physique et de Minéralogie"

THE MASSARD-D'ELVAUX PORTRAIT OF HAÜY. From "Tableau Méthodique des Espèces Minérales," by J. A. H. Lucas. Paris, 1806.